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CLAIMS

5 1. An optical device package comprising:
an optoelectronic device operably coupled to a surface
of a substrate, wherein said optoelectronic device is in
electrical communication with said substrate;

an enclosure coupled to said substrate, that houses
said optoelectronic device.

10 2. The optical device package of claim 1 wherein said
substrate is a standard rigid circuit board.

15 3. The optical device package of claim 1 wherein said
substrate is a flex-rigid circuit board.

4. The optical device package of claim 1 wherein said
substrate is a flex circuit board.

20 5. The optical device package of claim 1 wherein said
substrate is a ceramic substrate.

6. The optical device package of claim 1 wherein said
substrate is a silicon substrate.

25 7. The optical device package of claim 1 wherein said
substrate further comprises castellations for electrical
connection to a motherboard.

30 8. The optical device package of claim 1 wherein said
substrate further comprises waveguide structures to transmit
electrical signals and maintain high-speed signal integrity.

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9. The optical device package of claim 1 wherein said substrate further comprises transmission lines to transmit electrical signals and maintain high-speed signal integrity.

10. The optical device package of claim 8 wherein said waveguide structures comprise coplanar waveguides.

11. The optical device package of claim 8 wherein said waveguide structures comprise microstrips.

12. The optical device package of claim 8 wherein said waveguide structures comprise striplines

13. The optical device package of claim 1 wherein said optoelectronic device is directly mounted on said substrate.

14. The optical device package of claim 1 wherein said optoelectronic device is operably coupled to said substrate by a standoff.

15. The optical device package of claim 1 wherein said optoelectronic device is operably coupled to said substrate by a photodetector.

16. The optical device package of claim 1 wherein said optoelectronic device is operably coupled to said substrate by standard electrical devices.

17. The optical device package of claim 1 wherein said optoelectronic device comprises an optical transmitter.

18. The optical device package of claim 17 wherein said optical transmitter comprises a semiconductor laser.

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19. The optical device of claim 17 wherein said optical transmitter is a VCSEL.

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20. The optical device package of claim 17 wherein said optoelectronic device comprises a VCSEL transmitter with a power monitoring photodetector.

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21. The optical device package of claim 1 wherein said optoelectronic device comprises an optical receiver.

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22. The optical device package of claim 1 wherein said optoelectronic device comprises an integrated transceiver, wherein said transceiver comprises a transmitter, a power monitoring photodetector and a photodiode receiver.

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23. The optical device package of claim 22 wherein said optical transmitter comprises a semiconductor laser.

24. The optical device package of claim 23 wherein said semiconductor laser comprises a VCSEL.

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25. The optical device package of claim 1 wherein said optoelectronic device comprises an array of semiconductor lasers.

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26. The optical device package of claim 1 wherein said substrate comprises a signal ground plane and a case ground plane separated by a dielectric, wherein said signal and case ground planes are AC coupled for EMI and ESD protection.

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27. The optical device package of claim 1 wherein said optoelectronic device is wire bonded to said substrate to electrically communicate with said substrate.

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28. The optical device package of claim 1 wherein said optoelectronic device is flip chip mounted to said substrate to electrically communicate with said substrate.

29. The optical device package of claim 1 wherein said optoelectronic device is BGA mounted to said substrate to electrically communicate with said substrate.

30. The optical device package of claim 1 wherein said enclosure comprises a TO metal cap with an aperture window.

31. The optical device package of claim 30 wherein said TO metal cap maintains an air gap around said optoelectronic device.

32. The optical device package of claim 30 wherein said TO metal cap is resistively welded to said substrate.

33. The optical device package of claim 30 wherein said TO metal cap is epoxy bonded to said substrate.

34. The optical device package of claim 30 wherein said TO metal cap is laser welded to said substrate.

35. The optical device package of claim 1 wherein said enclosure comprises a plastic that substantially encapsulates said optoelectronic device.

36. The optical device package of claim 35 wherein said plastic enclosure maintains an air gap around said optoelectronic device.

37. The optical device package of claim 35 wherein said plastic enclosure further comprises an optical lensing element.

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38. The optical device package of claim 1 further comprising:

5 a fiber coupling assembly having a barrel which operably engages a fiber optic cable;

an alignment guide structure for passively aligning said fiber coupling assembly with said optical device.

10 39. The optical device package of claim 38 wherein said fiber coupling assembly further comprises a focusing lens.

40. The optical device package of claim 38 wherein said alignment guide structure further comprises:

15 molded guide members operably coupled to said fiber coupling assembly; and

vias in said substrate which operably engage said molded guide members.

20 41. The optical device package of claim 38 wherein the barrel of said fiber coupling assembly is non-cylindrical in cross-sectional shape.

25 42. The optical device package of claim 38 wherein the optoelectronic device is mounted directly on said substrate and emits vertically, and wherein the fiber coupling assembly further comprises a mirror to redirect light ninety degrees.

30 43. The optical device package of claim 42 wherein said mirror is a total internal reflection mirror.

35 44. The optical device package of claim 42 wherein said fiber coupling assembly further comprises a lensing element to focus the light into said fiber optic cable.

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45. An optical device package comprising:
an optoelectronic device coupled to a substrate,
5 wherein said substrate comprises a signal ground plane and a case
ground plane separated by a dielectric, wherein said signal and
case ground planes are AC coupled.

46. The optical device package of claim 45 wherein said
10 substrate is a flex-rigid circuit board, and wherein said flex-
rigid circuit board comprises a daughter board coupled to a
mother board by a flexible substrate.

47. A method of packaging an optoelectronic device
15 comprising the steps of:
operably mounting an optoelectronic device on a
substrate;
electrically coupling the optoelectronic device to said
substrate;
20 sealing the optoelectronic device.

48. The method of claim 45 wherein said optoelectronic
device is sealed with a plastic encapsulant.

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